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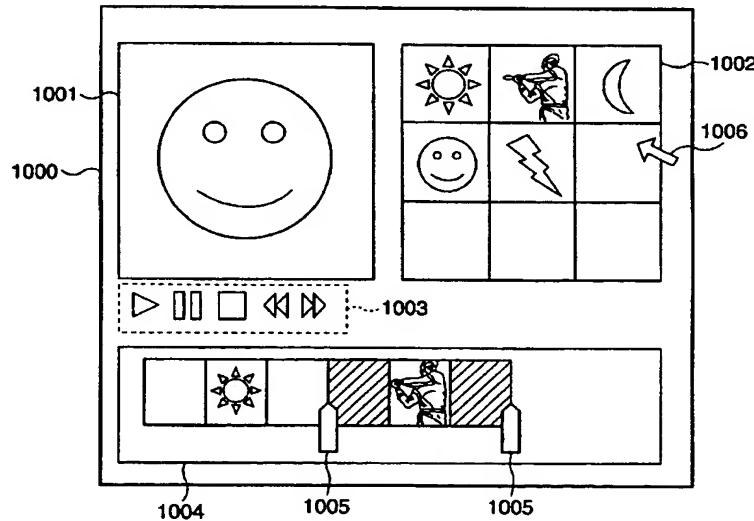
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(54) Title: MOVING IMAGE MANAGEMENT APPARATUS AND METHOD



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(57) Abstract: A moving image data management apparatus which manages moving image data and representative image data by using one or plural representative image data in correspondence with each moving image data. A thumbnail representing an arbitrary section in a moving image represented by moving image data is generated, and stored in a thumbnail area of the moving image file. Indexes corresponding to the respective thumbnails are stored in an index area of the moving image file. Each index includes start point/end point indicating a section in moving image data represented by the thumbnail image and attribute information indicating usage of the thumbnail. By this attribute information, operability of moving image data using representative images can be improved upon execution of various moving image data processing, and management of the representative images can be simplified.



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DESCRIPTION

MOVING IMAGE MANAGEMENT APPARATUS AND METHOD

5 TECHNICAL FIELD

The present invention relates to moving image data management apparatus and method for management of moving image data recorded on a storage medium by one or plural representative images.

10

BACKGROUND ART

Conventionally, a method of managing moving images recorded on a storage medium by using representative images has been proposed. Japanese Patent No. 03081304 discloses utilizing representative images in general reproduction apparatus for moving and still images, and especially discloses using representative images for simplified display upon selection of still or moving image. Further, Japanese Published Unexamined Patent Application Nos. Hei 11-176137 and 2000-322875 disclose assigning a representative image to a moving image section, and selecting a section as a target of reproduction designation by using the representative image.

As such representative image is generally used, variety of usage of representative image increases. For example, image management using the representative

images can be applied to an editing apparatus as well as the above-described reproduction apparatus.

However, even regarding the same moving image, a representative image appropriate to a user interface upon reproduction and a representative image appropriate to a user interface upon editing are different from each other. Accordingly, if the same representative image is to be used in various apparatuses including an editing apparatus, the following problem occurs.

For example, in Fig. 1, reference numeral 11 denotes a moving image. In this moving image, the motion of a batter who holds a bat at the ready and hits a ball is recorded in a section (a). Numerals 12 and 13 denote representative images regarding the same section (a).

The representative image 12, formed from a head frame of the section (a), is an image of the batter at the ready. The representative image 13, which is an image of the batter when he hits the ball, is a most appropriate representative image to indicate the content of the section (a).

Generally, as one representative image is assigned to one section, one of the representative images 12 and 13 is actually registered as a representative image of the section (a). The registered representative image can be used as an index image for e.g. a reproduction apparatus. However, if the representative image 13 is registered, upon selection of representative image in

the reproduction apparatus, reproduction starts from a status prior to the hit, thus a user feels unnatural. On the other hand, if the representative image 12 is registered, when the image is used in an editing apparatus, the content of the section (a) cannot be precisely grasped by the image 12. That is, in the example of Fig. 1, it cannot be determined from the representative image 12 whether the section (a) indicates a scene where the batter hits the ball or a scene where the batter swings at the ball and miss. In this manner, an appropriate representative image in one section of moving image depends on the purpose of apparatus to be used.

Conventionally, assignment and management of representative images are necessary in accordance with purpose and usage of moving image data such as reproduction and editing. Accordingly, information on the representative images are redundantly held by moving image or still image, or by apparatus or usage. Further, program code for processing to utilize the information is respectively held for the representative images. That is, when the representative images are utilized in various moving image data processing, the information on the representative images are respectively managed by apparatus or program. Accordingly, it is wasteful to independently store the representative image data. To attain excellent operability upon use of appropriate

representative image, management of representative images becomes complicated.

DISCLOSURE OF THE INVENTION

5 The present invention has been made in consideration of the above problem, and has its object to improve operability of moving image data using representative images upon execution of various moving image data processing and to simplify management of the
10 representative images.

According to the present invention, the foregoing object is attained by providing a moving image management apparatus for management of plural moving images recorded on a storage medium in correspondence with one or plural representative images, comprising:
15 means for recording a representative image representing an arbitrary section or the whole of a moving image;
means for recording information indicating the section or the whole of the moving image represented by said
20 representative image in correspondence with said representative image; and means for recording information indicating a position of an image as a base of said representative image in correspondence with said representative image, wherein in case of said
25 representative image is designated by a user, it is interpreted that the section or the whole of the moving image represented by the representative image is

selected.

According to another aspect of the present invention, the foregoing object is attained by providing a moving image management apparatus for management of plural moving images recorded on a storage medium in correspondence with one or plural representative images, comprising: generation means for generating a representative image representing an arbitrary section or the whole of a moving image; first recording means for recording information indicating the section or the whole of the moving image represented by said representative image in correspondence with said representative image; and second recording means for recording information indicating a position of an image as a base of said representative image in correspondence with said representative image.

Still another aspect of the present invention, the foregoing object is attained by providing a moving image management method for management of plural moving images recorded on a storage medium in correspondence with one or plural representative images, comprising: a step of recording a representative image representing an arbitrary section or the whole of a moving image; a step of recording information indicating the section or the whole of the moving image represented by said representative image in correspondence with said representative image; and a step of recording

information indicating a position of an image as a base
of said representative image in correspondence with said
representative image, wherein in case of said
representative image is designated by a user, it is
5 interpreted that the section or the whole of the moving
image represented by the representative image is
selected.

Still another aspect of the present invention, the
foregoing object is attained by providing a moving image
10 management method for management of plural moving images
recorded on a storage medium in correspondence with one
or plural representative images, comprising: a
generation step of generating a representative image
representing an arbitrary section or the whole of a
15 moving image; a first recording step of recording
information indicating the section or the whole of the
moving image represented by said representative image in
correspondence with said representative image; and a
second recording step of recording information
20 indicating a position of an image as a base of said
representative image in correspondence with said
representative image.

Other features and advantages of the present
invention will be apparent from the following
25 description taken in conjunction with the accompanying
drawings, in which like reference characters designate
the same name or similar parts throughout the figures

thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated
5 in and constitute a part of the specification,
illustrate embodiments of the invention and, together
with the description, serve to explain the principles of
the invention.

Fig. 1 is an explanatory view of problem in
10 utilization of representative image;

Fig. 2 is a block diagram showing a control
construction of a moving image processing apparatus
according to an embodiment;

Fig. 3 is a block diagram showing a functional
15 construction of the moving image processing apparatus
according to the embodiment;

Fig. 4 is a schematic diagram showing an example
of thumbnail storage status in a moving image file
according to the embodiment;

20 Fig. 5 is a table showing an example of data
structure for 1 index in an index area 406 in a footer
403 in Fig. 4;

Figs. 6A and 6B are tables showing examples of
data structure of thumbnail 405 in a header 401 and 1
25 thumbnail in a thumbnail area 407 in the footer 403 in
Fig. 4;

Fig. 7 is a flowchart showing an example of

thumbnail registration operation according to the embodiment;

Figs. 8A and 8B are examples of user interface upon execution of browser;

5 Figs. 9A and 9B are flowcharts showing processing upon browser operation in the moving image management apparatus;

Fig. 10 is an example of the user interface upon moving image editing by an editing unit 305;

10 Fig. 11 is a flowchart showing a thumbnail display operation upon the moving image editing by the editing unit 305; and

Fig. 12 is a flowchart explaining utilization of thumbnail in print operation.

15

BEST MODE FOR CARRYING OUT THE INVENTION

A preferred embodiment of the present invention will now be described in detail in accordance with the accompanying drawings.

20 In the present embodiment, in a method for utilizing representative images, to manage/utilize information related to representative images in a simple manner, the information is prepared for shared access, and redundant information for distinction or shared
25 access is added to the information related to representative images in correspondence with usage or the like. In this arrangement, information on the

representative images or the like can be recorded and stored in a simple manner, thus waste is avoided. Further, according to the present embodiment, as information necessary for realizing unique functions of 5 respective apparatuses and programs is included in the information on representative images or the like, the functions can be realized. Further, upon storage of the information related to representative image, the arrangement, format or the like of the storage is 10 changed in accordance with usage or format of the information.

Fig. 2 is a block diagram showing a control construction of a moving image processing apparatus according to the present embodiment. In Fig. 2, numeral 15 201 denotes a CPU which performs various controls in the moving image management apparatus. Numeral 202 denotes a ROM in which a boot program executed upon boot-up of the apparatus and various data are stored. Numeral 203 denotes a RAM in which a control program for processing 20 by the CPU 201 is stored, and which provides a work area for execution of various controls by the CPU 201.

Numeral 204 denotes a keyboard, and 205, a mouse, providing an environment for user's various input operations.

25 Numeral 206 denotes an external storage device comprising a hard disk, a floppy disk, an optical disk, a magneto-optic disk, a magnetic tape, non-volatile type

semiconductor memory (e.g. flash memory) or the like. Numeral 207 denotes a display unit comprising a display or the like which displays a user interface upon image editing, the result of image editing and the like for 5 the user. Numeral 208 denotes a network interface which enables communication with respective devices on a network. Numeral 209 denotes a video interface which reads a moving image from a video camera 210 and a VTR 212. Numeral 211 denotes a bus interconnecting the above 10 respective elements.

Note that the video camera 210, the VTR 212 and the external storage device 206 are not limited to those incorporated in or directly connected to the apparatus, but devices arranged on the network can be used.

15 Fig. 3 is a block diagram showing a functional construction of the moving image processing apparatus according to the present embodiment. Numeral 300 denotes a user operation unit which obtains the user's designation or input via the keyboard 204, the mouse 205 20 and the like. Numeral 301 denotes a moving image input unit which reads a moving image from the video camera 210, the VTR 212 or the like via the video I/F 209, and inputs the image into the apparatus. Numeral 302 denotes a moving image file storage unit comprising the external 25 storage device 206, which holds moving images inputted by the moving image input unit 301 in file format.

Numeral 303 denotes a thumbnail formation unit

which presents a moving image stored in the moving image file storage unit 302 on the display unit 207, such that the user designates a desired section and a frame image in the section. The thumbnail formation unit forms a 5 reduced image (hereinbelow, thumbnail image) based on the designated frame image, and stores it, with information on the designated section or the like, into the moving image file storage unit 302. That is, by the thumbnail formation unit 303, the user can refer to the 10 moving image presented on the display unit 207, and designate a section in the moving image and a frame representing the section via the user operation unit 300. Then the thumbnail image based on the designated frame image is stored, with the information on the designated 15 section or the like, into the moving image file storage unit 302.

Numeral 304 denotes a browser unit which reads a thumbnail from the moving image file storage unit 302 and displays it via the display unit 207, and reproduces 20 a moving image corresponding to the thumbnail selected by the user. Numeral 305 denotes an editing unit which performs editing on a moving image in the moving image file storage unit 302. Further, the progress and result of the editing are displayed via the display unit 207.

25 Note that the functions of the above-described respective elements are realized by execution of the control program stored in the ROM 202 by the CPU 201.

Otherwise, it may be arranged such that the control program is appropriately loaded from the external storage device 206 onto the RAM 203 and executed by the CPU 201.

5 <1. Thumbnail Storage Method>

Fig. 4 is a schematic diagram showing an example of thumbnail storage status in a moving image file according to the embodiment.

Numeral 400 denotes a moving image file stored on
10 a storage medium by a moving image file storage unit 302. Note that the unit of storage is not limited to 1 moving image file, but the unit may be a shot from depression of recording button of the image sensing device to stoppage of image sensing, or may be 1 TV broadcast
15 program. The moving image file 400 comprises a header 401 in which management information or the like is recorded, a moving image 402 in which moving image data itself is recorded, and a footer 403 in which mainly a thumbnail is recorded.

20 In the header 401, moving image file management information 404 on the data size, the format, the date of formation and the like of the moving image file, and 1 image of thumbnail 405 are recorded. The footer 403 has a thumbnail area 407 in which plural thumbnails can
25 be recorded and an index area 406 in which index information on the respective thumbnails are recorded.

Fig. 5 is a table showing an example of data

structure for 1 index in the index area 406 in the footer 403 in Fig. 4. In the figure, "Start Point" and "End Point" are start point and end point of a section in a moving image represented by the thumbnail. The form 5 of the start point and the end point is not particularly limited as long as the points specify the section in the moving image, however, it is preferable that the points are described in time code or frame ID. In "Thumbnail Type ID", an ID indicating the purpose of the thumbnail 10 is described. In the present embodiment, Thumbnail Type IDs are determined for purposes of thumbnail as follows.

Thumbnail Type ID=1: for browser

Thumbnail Type ID=2: for moving image editing

15 Thumbnail Type ID=3: for printing

In this example, IDs are defined for application types to use the thumbnail.

Further, in "Thumbnail Offset", an offset to the 20 thumbnail indicated by the index is described.

Figs. 6A and 6B are tables showing examples of data structure of thumbnail 405 in the header 401 and 1 thumbnail in the thumbnail area 407 in the footer 403 in Fig. 4. In Fig. 6A, in "Thumbnail Header", management 25 information of the thumbnail image or the like is described. Further, in "Thumbnail Image", the thumbnail image data itself is described. Further, Fig. 6B shows

an example of data structure of the "Thumbnail Header". In "Thumbnail Image Offset", an offset from the head of the "Thumbnail Header" to the storage position of the thumbnail image is described. In "Thumbnail Image Size", 5 the size of the thumbnail image is described. In "Thumbnail Key Relative Point", the frame position in the moving image as a base of the thumbnail is described as a relative position from the "Start Point".

<Thumbnail Registration Processing>

10 Fig. 7 is a flowchart showing an example of thumbnail registration operation according to the embodiment.

First, at step S100, the moving image input unit 301 inputs a moving image, and records it in the format 15 of the moving image file 400 shown in Fig. 4 into the moving image file storage unit 302. At this time, an area for storing a thumbnail in the header 401 and a footer area are ensured as reserved areas (physical area of the storage medium). For example, in case of optical 20 disk, the reserved areas are ensured in inner circumferential area. Next, at step S101, it is determined whether or not thumbnail designation has been made by the user. The thumbnail designation means designation of arbitrary frame in the moving image as a 25 base of the thumbnail, a section in the moving image represented by the thumbnail, the purpose of the thumbnail, designation as to whether the thumbnail is

important or not, and the like, made by the user utilizing the function of the apparatus at this step S101. When the user makes setups, the user sets the apparatus to a setting mode, then designates a desired 5 section in the moving image by the keyboard or the mouse, then performs reproduction, and when an image from which the user wants to form a thumbnail is displayed, the user designates a frame to be a thumbnail by the keyboard or the mouse. In this case, the designated 10 frame is a base image of the thumbnail, and the designated desired section is the section in the moving image represented by the thumbnail. Note that in the thumbnail setting, various methods of e.g. user's setting and automatic setting by the apparatus may be 15 used. In the present invention, any of setting may be employed. Further, designation of the purpose of thumbnail, designation as to whether the thumbnail is important or not, may be made by the keyboard or the mouse via a predetermined user interface.

20 Next, at step S102, it is determined whether or not the designation that the thumbnail is important has been made. The designation of important thumbnail means that the thumbnail most properly represents the entire moving image file. If the designation of important 25 thumbnail has been made by the user, process proceeds to step S103, at which the frame position designated for the generation of thumbnail is corrected to a relative

position from the head of the moving image file, to obtain the "Thumbnail Key Relative Point". Next, at step S104, a thumbnail is generated from the designated frame, and the thumbnail, having the "Thumbnail Key Relative Point" calculated at step S103, the size of the thumbnail image (Thumbnail Image Size), and information on relative distance to the storage position of the thumbnail image (Thumbnail Image Offset) as a header, is recorded into the header 401. At this time, the header 10 401 is stored in a position for comparatively quick and easy access on the storage medium, e.g., in use of optical disk, in an inner peripheral portion. Then, the process returns to step S101.

On the other hand, if it is determined at step 15 S102 that the designation of significant thumbnail has not been made, the process proceeds to step S105. At step S105, a new index is ensured in an unused area of the index area 406 in the footer 403 in the moving image file 400. Next, at step S106, a new thumbnail is ensured 20 in an unused area of the thumbnail area 407. Next, at step S107, an offset value to the thumbnail ensured at step S106 is calculated.

Next, at step S108, the type of designated thumbnail is determined based on the purpose designated 25 by the user. In the present embodiment, any one of browsing, moving image editing and printing is designated by the user as the purpose. The process

branches to one of steps S109 to S111 in accordance with the designated type, and a corresponding Thumbnail Type ID is set. The ID setting is made by holding a table of the above-described Thumbnail Type IDs in advance and referring to the table. In the present embodiment, if the purpose is browsing, setting is made as Thumbnail Type ID=1 (S109); if the purpose is moving image editing, setting is made as Thumbnail Type ID=2 (S110); and if the purpose is printing, setting is made as Thumbnail Type ID=3 (S111). In the present embodiment, 3 types are given, however, the number of types is not limited to 3.

Next, at step S112, an index having the offset (Thumbnail Offset) calculated at step S107, the Thumbnail Type ID set at steps S108 to S111, and the Start Point and the End Point indicating the section designated by the user, is generated, and stored into the footer 403.

Next, at step S113, the position of the frame adopted as the thumbnail is corrected to a relative position from the header of the section, and the Thumbnail Key Relative Point is obtained. At step S114, a thumbnail is generated by reducing the frame designated at step S101, and the thumbnail is stored, with the Thumbnail Key Relative Point calculated at step S113, the image size (Thumbnail Image Size) of the thumbnail and information on a relative distance to the storage position of the thumbnail image (Thumbnail Image

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Offset) as the Thumbnail Header (Fig. 6A), into the footer 403. Next, the process returns to step S101, and if the designation of thumbnail is made again, the processing at steps S102 to S114 is repeated. Note that
5 it is preferable that the footer 403, especially the thumbnail area 407, is stored in a continuous area on the storage medium.

Further, if it is determined at step S101 that the designation of thumbnail has not been made, the process
10 proceeds to step S115, at which if it is determined that termination of registration processing has been instructed, the process ends. If it is determined that the termination of registration processing has not been instructed, the process returns to step S101, to repeat
15 the above processing.

By the above processing, a significant thumbnail can be stored in a position for quick and easy access (e.g. in use of optical disk, an inner peripheral portion) on the storage medium. Further, thumbnails for
20 different purposes can be discriminated by Thumbnail Type IDs, these thumbnails can be stored in the same file, thus management can be simplified.

<Thumbnail Utilization Processing>

Processing upon utilization of thumbnail
25 registered by the above thumbnail registration processing will be described.

First, utilization of thumbnail in a browser will

be described. Figs. 8A and 8B are examples of user interface of a browser. In Fig. 8A, numeral 801 denotes an entire display area of the browser. Numeral 802 denotes an area where arrayed thumbnails are displayed.

5 The thumbnails are displayed from the top line, from the left to the right. Numeral 803 denotes a scroll bar. In a case where the thumbnails cannot be displayed within the thumbnail display area 802 at once, they can be sequentially displayed by dragging in the scroll bar.

10 Numeral 804 denotes a pointer. The user moves the pointer 804 by operation at the user operation unit 300, to designate a desired thumbnail in the thumbnail display area 802. When the thumbnail is selected by the pointer 804, the display screen image changes to a

15 moving-image reproduction screen image 805 as shown in Fig. 8B, and moving image reproduction is started.

Hereinbelow, processing to realize the utilization of thumbnail in a browser will be described. Figs. 9A and 9B are flowcharts showing processing upon browser operation in the moving image management apparatus. Note that the processing shown in Figs. 9A and 9B is executed when browser processing is started in the moving image management apparatus and a moving image file to be browsed is designated. Note that upon designation of moving image file to be browsed, the thumbnails representing the respective moving image files (thumbnails stored in the headers of the respective

moving image files) are displayed in the thumbnail display area in Fig. 8A, and a desired moving image file is selected by designating a desired thumbnail by the pointer 804. When the desired moving image file is 5 selected, the processing shown in Figs. 9A and 9B is started.

First, at step S201, the browse unit 304 reads the header 401 of the moving image file 400 selected by the above operation among the moving image files stored by 10 the moving image file storage unit 302. Then the browse unit obtains various basic management information such as the file size from the moving image file management information 404, and stores the information into the memory (RAM 203). Next, at step S202, the unit reads the 15 index area 406 in the footer 403, and performs sorting on the indexes included in the index area 406 read at step S202 by start position (Start Point in Fig. 5) in ascending order, for display of thumbnails to be described later in time sequential order.

20 Next, at step S204, a thumbnail display start number N is obtained from the current position of the bar of the scroll bar 803. For example, if the scroll bar 803 is at an upper end (as shown in Fig. 8), display start number N = 1 holds. Accordingly, display is 25 started from the first thumbnail.

Next, by performing the following processing at steps S205 to S212 sequentially from the head index,

thumbnails for browsing are displayed in the thumbnail display area 802 from the N-th and subsequent thumbnails.

First, at step S205, it is checked whether or not the thumbnail in the index is for browsing by checking 5 the Thumbnail Type ID in the index. As described above, assuming that Thumbnail Type ID=1 to 3 are defined, it is determined that a thumbnail for which Thumbnail Type ID=1 is set is a thumbnail for browsing. Note that upon start of processing, checking is started from the head 10 after the sorting.

If it is determined at step S205 that it is a thumbnail for browser, the process proceeds to step S206. At step S206, the number C (the order in the thumbnails for browser) is counted. At step S207, it is checked 15 whether or not the counted number C is less than the display start number N ($C < N$). This processing is made for skipping thumbnails before the number N without display.

If the number C is equal to or greater than the 20 display start number N, the thumbnail image is read for thumbnail display at the next step S208. Next, at step S209, the thumbnail image is displayed in the thumbnail display area 802, and the process proceeds to step S210. On the other hand, if it is determined at step S205 that 25 the thumbnail is not for browsing, or if it is determined at step S207 that the number C is less than the number N, the process proceeds to step S210.

At step S210, the processing subject is moved to the next index to process the next thumbnail. In a case where the immediately previous processing has been performed on the last index and there is no next index, 5 the process proceeds to step S213. If the next index exists, the process proceeds to step S212, at which it is checked whether or not the number has exceeded the number of displayable thumbnails in the thumbnail display area 802. For example, in the example in Fig. 8, 10 the number of displayable thumbnails is 9. If the number is not over the number of displayable thumbnails, the process returns to step S205. That is, the processing at steps S205 to S210 is performed to sequentially check the indexes until there is no index to be processed or 15 the number exceeds the number of displayable thumbnails.

If there is no index to be processed or the number exceeds the number of displayable thumbnails in the thumbnail display area 802, the process proceeds to step S213. At step S213, it is checked whether or not the scroll bar has been operated by the user. If it has been 20 operated, the processing at steps S204 to S212 is repeated, thereby a thumbnail corresponding to the position of the operated scroll bar is displayed. If the scroll bar has not been operated, the process proceeds 25 to step S214.

Next, at step S214, it is determined whether or not one of the thumbnails displayed in the thumbnail

display area 802 has been selected by the user. If a thumbnail has been selected, the process proceeds to step S215, at which the Start Point is read from the index corresponding to the selected thumbnail. Next, at 5 step S216, moving image reproduction is started from the Start Point, and the moving image is displayed in the moving image reproduction screen image 805. Thereafter, the process proceeds to step S217. On the other hand, if it is determined at step S214 that a thumbnail has not 10 been selected, the process proceeds to step S217.

At step S217, it is determined whether or not termination of browsing by the browse unit 304 has been instructed. If it is determined that termination has not been instructed, the process returns to step S213. If it 15 is determined that termination has been instructed, the process ends.

Note that in the above example, when a thumbnail is selected, the Start Point is obtained from the corresponding index and reproduction is started from the 20 position, however, the reproduction is not limited to this arrangement. It may be arranged such that the Start Point and the End Point are obtained from the index corresponding to the selected thumbnail and only the section is reproduced.

25 In the above description, browsing is made in one moving image file for the sake of simplicity of explanation, however, even in thumbnail selection in

plural moving image files, the selection can be made by repeating the processing to display a thumbnail for the respective moving image files.

By the above processing, the browse unit 304 reads
5 only thumbnail(s) for browsing from the thumbnail area
407 and utilizes it.

Next, utilization of thumbnail in moving image editing will be described. In this example, the following case is supposed. That is, thumbnails for
10 editing has been added to each moving image file beforehand. These thumbnails are utilized to collect favorite scenes which are scattered in the plurality of files, in order to create single moving image data or create a play-list describing reproduction designation
15 information of a plurality of moving image files. Fig.
10 is an example of the user interface upon moving image editing by an editing unit 305. Numeral 1000 denotes an editing operation window in which an editing operation is performed. Numeral 1001 denotes a reproduction window
20 in which a selected moving image file or the result of editing is reproduced for checking. Numeral 1002 denotes a moving image file window for display of a list of thumbnails in the headers of the respective moving image files. Numeral 1003 denotes operation buttons for
25 operation of moving image reproduced in the reproduction window 1001, for "reproduction, temporary stoppage, stoppage, reverse and fast-forward" operations from the

left.

Numeral 1004 denotes a scene designation window in which selected moving image files are arrayed for designation of section in the respective moving images.

- 5 Note that as display of the respective moving image files, thumbnail images are overlay-displayed for the user's recognition. Numeral 1005 denotes a scene designation bar. The start point and the end point of selected clip (hatched portion) can be designated by
- 10 operating the scene designation bar. For this purpose, contents of frames corresponding to a portion of the moving image indicated by the scene designation bar 1005, are displayed in the reproduction window 1001 while the scene designation bar 1005 is operated. Accordingly, the
- 15 user can accurately specify the start point and the end point by confirming the image displayed in the reproduction window 1001 and operating the scene designation bar 1005.

- 20 Numeral 1006 denotes a pointer. The user moves the pointer 1006 by operating the user operation unit 300, to designate selection of various buttons and designation of operation. In an operation procedure, a moving image files are selected from the moving image file window 1002 and dragged and dropped into the scene
- 25 designation window 1004 in the order of reproduction. Then, the start point and the end point area corrected by using the scene designation bar 1005. At this time,

the user performs moving image reproduction in the reproduction window 1001 by operating the operation unit 1003 in accordance with necessity thereby checks the image.

5 Fig. 11 is a flowchart showing a thumbnail display operation upon the moving image editing by the editing unit 305. Note that the processing in Fig. 11 is started when moving image editing processing is executed in the moving image management apparatus.

10 First, at step S300, the editing unit 305 reads the header 401 of all the moving image files from the moving image file storage unit 302. Next, at step S301, the editing unit reads the thumbnail 405 in the header 401 of the respective files. Then at step S302, the
15 editing unit displays the thumbnails in the headers as representative images of the respective moving image files in the moving image file window 1002.

Next, at step S303, it is determined whether or not a moving image file has been selected. In the
20 present embodiment, it is determined whether or not the moving image file(s) has been dragged and dropped from the moving image file window 1002 to the scene designation window 1004 by operation of the pointer 1006. If moving file(s) has been selected, the process
25 proceeds to step S304, at which the index area 406 is read from the footer in the moving image file selected by the user. Then, bar display is performed to display

the moving image file in the scene designation window 1004. At this time, the entire moving image is the range of designation for the selected moving image file. Further, at this time, a representative thumbnail of the 5 moving image file is displayed as the bar display of the moving image file displayed in the scene designation window 1004. On the other hand if it is determined at step S303 that moving image file selection has not been made, step S304 is skipped.

10 Next, at step S305, it is checked whether or not the user has designated a range of scene regarding the moving image file by the scene designation bar 1005 in the scene designation window 1004. If the range designation has been made, thumbnail(s) for editing 15 existing within the range designated by the user is extracted and displayed at steps S306 to S311.

First, at step S306, the Start Point and the End Point in the index (upon start of processing, the head index) are referred to, and it is determined whether or 20 not a section indicated by the Start Point and the End Point is within the range designated by the user. If it is within the range, the process proceeds to step S307, at which it is determined whether or not the thumbnail corresponding to the index is a thumbnail for editing. 25 The checking is made by checking the Thumbnail Type ID in the index. In a case where the Thumbnail Type IDs are defined as described above, if Thumbnail Type ID=2 holds,

it is determined that the thumbnail is for editing. If it is a thumbnail for editing, the process proceeds to step S310.

On the other hand, if it is determined at step 5 S306 that the section corresponding to the index is not within the range designated by the user, or if it is determined at step S307 that the thumbnail is not for editing, the process proceeds to step S308 to process the next index. At step S309, it is determined whether 10 or not the next index exists. If the next index exists, the processing at steps S306 and S307 is repeated.

If the condition at step S307 is satisfied, the process proceeds to step S310, at which a thumbnail image corresponding to the index is read. Then at step 15 S311, the thumbnail image is displayed. For example, as shown in Fig. 10, in the scene designation window 1004, the thumbnail image is overlay-displayed on a bar indicating the scene. By this display, the user can easily recognize the scene in the designated range. 20 Thereafter, the process proceeds to step S308, to repeat the above-described processing on the next index.

By the above processing, thumbnails of all the sections within the range designated by the user are overlay-displayed on the bars indicating the scenes. 25 Note that the display range of thumbnail is an area designated by 2 scene designation bars 1005. If the size of area between the designation bars is insufficient, a

part of the thumbnail may be overlaid or a scroll bar may be displayed for scrollable display.

If it is determined at step S305 that a scene range has not been designated by the user, or if it is 5 determined at step S309 that there is no index to be processed, the process proceeds to step S312. At step S312, it is determined whether or not termination of the moving image editing operation has been instructed. If the termination of the editing operation has not been 10 instructed (the moving image editing is performed), the process returns to step S303 to repeat the above processing. On the other hand, if it is determined that the termination of the editing operation has been instructed, the process ends.

15 By the above processing, upon file selection, the editing unit 305 can use a significant thumbnail stored in the header, and utilize only thumbnails for moving image editing corresponding to the designated range from the thumbnail area 407.

20 Note that in the above embodiment, the browsing and moving image editing have been described as utilization of thumbnail images, however, the usage is not limited to these 2 operations, but thumbnail images can be used for various purposes such as printing of 25 frame image corresponding to a selected thumbnail. For example, if a frame image corresponding to a selected thumbnail is printed, processing as shown in the

flowchart of Fig. 12 is performed. First, a thumbnail is obtained from the header 401 of the respective moving image files, and the thumbnails are displayed in a list, then a desired moving image file (moving image data) is 5 designated by the user (S401). Among the thumbnails corresponding to the designated image data (thumbnails recorded in the footer), thumbnails where the Thumbnail Type ID is "3" are extracted and displayed (S402 and S403). In the subsequent processing, one of the 10 thumbnail is selected, and a frame as a base of the selected thumbnail is printed. That is, an image of the frame specified by the Thumbnail Key Relative Point as shown in Fig. 6 of the designated thumbnail is obtained (S404 to S406), and it is outputted for printing (S407). 15 Accordingly, another function such as a printing unit may be added to the moving image processing apparatus in Fig. 3. Note that if selection from the displayed thumbnail is not performed and termination is instructed, the process ends (S404 and S408).

20 Note that in the above embodiment, the browsing unit and the editing unit are provided as functions for utilizing thumbnails, however, 3 or more functions including the above-described printing unit or the like, or only one of them, or another combination of other 25 functions may be used.

Note that in the above embodiment, the moving image processing shown in Fig. 3 is a single apparatus

including the moving image input unit 301, the thumbnail formation unit 303, the browse unit 304, and the editing unit 305. However, the moving image processing apparatus may be constructed as plural apparatuses of respective functions, including the above-described printing unit, or apparatuses having combinations of several functions.

In such case, a moving image file including thumbnails may be transmitted among the respective apparatuses via a storage medium or communication means such as IEEE 1394.

Note that in the above embodiment, since there is no index for the header thumbnails, the header thumbnails do not have the Start Point, the End Point and the Thumbnail Type ID, however, these information may be held as management information. In this case, a number or the like indicating the purpose of thumbnail is stored, and it can be utilized in various applications.

Note that in the above embodiment, the thumbnail recorded in the header (thumbnail representing the file) is not recorded in the footer, but the thumbnail may be recorded in the header and the footer.

Further, if one thumbnail is used for plural purposes (e.g., browsing and editing), such plural purposes can be designated by deciding a value stored in the Thumbnail Type ID to an appropriate value. Further, according to operation purposes, thumbnail can be

properly utilized. For example, head image of a certain scene is used for thumbnail for browsing while representative image of the scene is used for thumbnail for editing.

5 As described above, according to the present embodiment, as thumbnails for different purposes can be stored in 1 file, management of the thumbnails is simplified. Further, upon use of the thumbnails, only thumbnail(s) corresponding to the purpose can be
10 utilized by referring to the type information attached to the thumbnails (Thumbnail Type ID).

Further, the object of the present invention can be also achieved by providing a storage medium storing program code for performing the aforesaid processes to a
15 system or an apparatus, reading the program code by a computer (e.g., CPU, MPU) of the system or apparatus from the storage medium, then executing the program.

In this case, the program code read from the storage medium realize the functions according to the
20 embodiment, and the storage medium storing the program code constitutes the invention.

Further, the storage medium, such as a floppy disk, a hard disk, an optical disk, a magneto-optical disk, a
25 CD-ROM, a CD-R, a magnetic tape, a non-volatile type memory card, and a ROM can be used for providing the program code.

CLAIMS

1. A moving image management apparatus for management of plural moving images recorded on a storage medium in
5 correspondence with one or plural representative images,
comprising:

means for recording a representative image representing an arbitrary section or the whole of a moving image;

10 means for recording information indicating the section or the whole of the moving image represented by said representative image in correspondence with said representative image; and

15 means for recording information indicating a position of an image as a base of said representative image in correspondence with said representative image,
wherein in case of said representative image is designated by a user, it is interpreted that the section or the whole of the moving image represented by the
20 representative image is selected.

2. The moving image management apparatus according to claim 1, further comprising:

25 ~~of use~~ means for recording information indicating a purpose of said representative image as attribute information in correspondence with said representative image; and

means for selecting only said representative image
of use
corresponding to the purpose based on said attribute
information.

5 3. The moving image management apparatus according to
claim 2, when said representative image is designated by
the user, it is interpreted that the section or the
whole of the moving image represented by the
representative image is selected, and a function
10 corresponding to the purpose is applied to the selected
section or the whole of the moving image.

4. The moving image management apparatus according to
claim 1, further comprising:

15 means for recording information indicating a
purpose of said representative image as attribute
information; and

 means for classifying only said representative
image for each purpose based on said attribute
20 information.

5. The moving image management apparatus according to
claim 4, wherein when said representative image is
designated by the user, it is interpreted that the
25 section or the whole of the moving image represented by
the representative image is selected, and a function
corresponding to the purpose is applied to the selected

Furthermore, besides aforesaid functions according to the above embodiment are realized by executing the program code which are read by a computer, the present invention includes a case where an OS (operating system) 5 or the like working on the computer performs a part or entire processes in accordance with designations of the program code to realize functions according to the above embodiment.

Furthermore, the present invention also includes a 10 case where, after the program code read from the storage medium is written in a function expansion board which is inserted into the computer or in a memory provided in a function expansion unit which is connected to the computer, CPU or the like contained in the function 15 expansion board or unit performs a part or entire process in accordance with designations of the program code and realizes functions of the above embodiment.

EFFECT OF INVENTION

20 As described above, according to the present invention, operability of moving image data using a representative image is improved upon execution of various moving image data processing by adding a type attribute to a representative image, and management of 25 representative images can be simplified.

As many apparently widely different embodiments of the present invention can be made without departing from

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the spirit and scope thereof, it is to be understood that the invention is not limited to the specific embodiments thereof except as defined in the appended claims.

section or the whole of the moving image.

6. The moving image management apparatus according to
claim 2, wherein when said information indicating the
5 section or the whole of the moving image represented by
said representative image and said attribute information
are recorded on the storage medium, they are recorded by
representative image in a particular continuous portion.

10 7. The moving image management apparatus according to
claim 6, wherein when said information indicating a
position of an image as a base of said representative
image and said representative image are recorded on the
storage medium, they are recorded by representative
15 image in a particular portion.

8. The moving image management apparatus according to
claim 7, wherein said particular portion is a continuous
area on the storage medium.

20

9. The moving image management apparatus according to
claim 7 or 8, wherein only significant information of
said information indicating a position of an image as a
base of said representative image and said
25 representative image is recorded in a portion for easy
storage and access.

10. The moving image management apparatus according to
any one of claims 2 to 9, wherein in said means for
recording information indicating a purpose of said
representative image as attribute information, said
5 attribute information is an identification number
previously defined for purpose.

11. The moving image management apparatus according to
claim 3, wherein said means for selecting only said
10 representative image corresponding to the purpose based
on said attribute information selects a representative
image having said attribute information corresponding to
a browsing operation,
and wherein said apparatus has display means for
15 displaying the representative image,

further wherein application of function
corresponding to the purpose to the selected section or
the whole of the moving image is reproduction means for,
when a desired representative image is designated from
20 representative images displayed by said display means,
reproducing a corresponding moving image based on
section information added to the representative image.

12. The moving image management apparatus according to
25 claim 2, wherein if an editing range is designated in a
desired moving image, said means for selecting only said
representative image corresponding to said purpose based

on said attribute information selects a representative image having said attribute information corresponding to an editing operation and within the editing range,

and wherein said apparatus has display means for
5 displaying the representative image within said editing range.

13. The moving image management apparatus according to claim 3, wherein in a print operation to print a desired
10 frame in a desired moving image, said means for selecting only said representative image corresponding to the purpose based on said attribute information selects a representative image having said attribute information corresponding to the print operation from
15 representative images corresponding to said desired moving image,

and wherein said apparatus has display means for displaying the representative image having said attribute information corresponding to the print
20 operation,

further wherein application of function corresponding to a designated purpose to the selected section or the whole of the moving image when a desired representative image is designated from representative
25 images displayed by said display means, is output means for, when a desired representative image is designated from representative images displayed by said display

means, referring to the information indicating a position of an image as a base of said representative image, and outputting a desired frame for print output.

5 14. A moving image management apparatus for management of plural moving images recorded on a storage medium in correspondence with one or plural representative images, comprising:

 generation means for generating a representative
10 image representing an arbitrary section or the whole of a moving image;

 first recording means for recording information indicating the section or the whole of the moving image represented by said representative image in

15 correspondence with said representative image; and

 second recording means for recording information indicating a position of an image as a base of said representative image in correspondence with said representative image.

20

 15. The moving image management apparatus according to claim 14, further comprising:

 adding means for adding information indicating a purpose of said representative image as attribute
25 information;

 means for recording said attribute information added by said adding means in correspondence with said

representative image; and

means for selecting only said representative image corresponding to the purpose based on said attribute information.

5

16. The moving image management apparatus according to claim 15, wherein when said representative image is designated by the user, it is interpreted that the section or the whole of the moving image represented by 10 the representative image is selected, and a function corresponding to the purpose is applied to the selected section or the whole of the moving image.

17. The moving image management apparatus according to 15 claim 14, further comprising:

adding means for adding information indicating a purpose of said representative image as attribute information;

means for recording the attribute information 20 added by said adding means in correspondence with said representative image; and

means for classifying only said representative image for each purpose based on said attribute information.

25

18. The moving image management apparatus according to claim 17, wherein when said representative image is

designated by the user, it is interpreted that the section or the whole of the moving image represented by the representative image is selected, and a function corresponding to the purpose is applied to the selected
5 section or the whole of the moving image.

19. The moving image management apparatus according to claim 15, wherein when said information indicating the section or the whole of the moving image represented by
10 said representative image and said attribute information are recorded on the storage medium, they are recorded by representative image in a particular continuous portion.

20. The moving image management apparatus according to
15 claim 19, wherein when said information indicating a position of an image as a base of said representative image and said representative image are recorded on the storage medium, they are recorded by representative image in a particular portion.
20

21. The moving image management apparatus according to
claim 20, wherein said particular portion is a continuous area on the storage medium.

25 22. The moving image management apparatus according to
claim 20 or 21, wherein only significant information of
said information indicating a position of an image as a

base of said representative image and said representative image is recorded in a portion for easily storage and access.

5 23. The moving image management apparatus according to any one of claims 15 to 22, wherein in said means for recording information indicating a purpose of said representative image as attribute information, said attribute information is an identification number
10 previously defined for purpose.

24. The moving image management apparatus according to claim 16, wherein said means for selecting only said representative image corresponding to the purpose based
15 on said attribute information selects a representative image having said attribute information corresponding to a browsing operation,

and wherein said apparatus has display means for displaying the representative image,

20 further wherein application of function corresponding to the purpose to the selected section or the whole of the moving image is reproduction means for, when a desired representative image is designated from representative images displayed by said display means,
25 reproducing a corresponding moving image based on section information added to the representative image.

25. The moving image management apparatus according to
claim 15, wherein if an editing range is designated in a
desired moving image, said means for selecting only said
representative image corresponding to said purpose based
5 on said attribute information selects a representative
image having said attribute information corresponding to
an editing operation and within the editing range,

and wherein said apparatus has display means for
displaying the representative image within said editing
10 range.

26. The moving image management apparatus according to
claim 16, wherein in a print operation to print a
desired frame in a desired moving image, said means for
15 selecting only said representative image corresponding
to the purpose based on said attribute information
selects a representative image having said attribute
information corresponding to the print operation from
representative images corresponding to said desired
20 moving image,

and wherein said apparatus has display means for
displaying the representative image having said
attribute information corresponding to the print
operation,

25 further wherein application of function
corresponding to a designated purpose to the selected
section or the whole of the moving image when a desired

representative image is designated from representative images displayed by said display means, is output means for, when a desired representative image is designated from representative images displayed by said display means, referring to the information indicating a position of an image as a base of said representative image, and outputting a desired frame for print output.

27. A moving image management method for management of plural moving images recorded on a storage medium in correspondence with one or plural representative images, comprising:

a step of recording a representative image representing an arbitrary section or the whole of a moving image;

a step of recording information indicating the section or the whole of the moving image represented by said representative image in correspondence with said representative image; and

a step of recording information indicating a position of an image as a base of said representative image in correspondence with said representative image, wherein in case of said representative image is designated by a user, it is interpreted that the section or the whole of the moving image represented by the representative image is selected.

28. The moving image management method according to
claim 27, further comprising:

a step of recording information indicating a
purpose of said representative image as attribute
5 information in correspondence with said representative
image; and

a step of selecting only said representative image
corresponding to the purpose based on said attribute
information.

10

29. The moving image management method according to
claim 28, when said representative image is designated
by the user, it is interpreted that the section or the
whole of the moving image represented by the
15 representative image is selected, and a function
corresponding to the purpose is applied to the selected
section or the whole of the moving image.

30. The moving image management method according to
20 claim 27, further comprising:

a step of recording information indicating a
purpose of said representative image as attribute
information; and
a step of classifying only said representative
25 image for each purpose based on said attribute
information.

31. The moving image management method according to
claim 30, wherein when said representative image is
designated by the user, it is interpreted that the
section or the whole of the moving image represented by
5 the representative image is selected, and a function
corresponding to the purpose is applied to the selected
section or the whole of the moving image.

32. The moving image management method according to
10 claim 28, wherein when said information indicating the
section or the whole of the moving image represented by
said representative image and said attribute information
are recorded on the storage medium, they are recorded by
representative image in a particular continuous portion.

15

33. The moving image management method according to
claim 32, wherein when said information indicating a
position of an image as a base of said representative
image and said representative image are recorded on the
20 storage medium, they are recorded by representative
image in a particular portion.

34. The moving image management method according to
claim 33, wherein said particular portion is a
25 continuous area on the storage medium.

35. The moving image management method according to

claim 33 or 34, wherein only significant information of said information indicating a position of an image as a base of said representative image and said representative image is recorded in a portion for easily
5 storage and access.

36. The moving image management method according to any one of claims 28 to 35, wherein at said step of recording information indicating a purpose of said
10 representative image as attribute information, said attribute information is an identification number previously defined for purpose.

37. The moving image management method according to
15 claim 29, wherein at said step of selecting only said representative image corresponding to the purpose based on said attribute information, a representative image having said attribute information corresponding to a browsing operation is selected,
20 and wherein said method has a display step of displaying the representative image,
further wherein application of function corresponding to the purpose to the selected section or the whole of the moving image is a reproduction step of,
25 when a desired representative image is designated from representative images displayed at said display step, reproducing a corresponding moving image based on

section information added to the representative image.

38. The moving image management method according to
claim 28, wherein if an editing range is designated in a
5 desired moving image, said step of selecting only said
representative image corresponding to said purpose based
on said attribute information, a representative image
having said attribute information corresponding to an
editing operation and within the editing range is
10 selected,

and wherein said method has a display step of
displaying the representative image within said editing
range.

15 39. The moving image management method according to
claim 29, wherein in a print operation to print a
desired frame in a desired moving image, at said step of
selecting only said representative image corresponding
to the purpose based on said attribute information, a
20 representative image having said attribute information
corresponding to the print operation is selected from
representative images corresponding to said desired
moving image,

and wherein said method has a display step of
25 displaying the representative image having said
attribute information corresponding to the print
operation,

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further wherein application of function corresponding to a designated purpose to the selected section or the whole of the moving image when a desired representative image is designated from representative images displayed at said display step is an output step of, when a desired representative image is designated from representative images displayed at said display step, referring to the information indicating a position of an image as a base of said representative image, and outputting a desired frame for print output.

40. A moving image management method for management of plural moving images recorded on a storage medium in correspondence with one or plural representative images, comprising:

a generation step of generating a representative image representing an arbitrary section or the whole of a moving image;

a first recording step of recording information indicating the section or the whole of the moving image represented by said representative image in correspondence with said representative image; and

a second recording step of recording information indicating a position of an image as a base of said representative image in correspondence with said representative image.

41. The moving image management method according to
claim 40, further comprising:

an adding step of adding information indicating a
purpose of said representative image as attribute
5 information;

a step of recording said attribute information
added at said adding step in correspondence with said
representative image; and

10 a step of selecting only said representative image
corresponding to the purpose based on said attribute
information.

42. The moving image management method according to
claim 41, wherein when said representative image is
15 designated by the user, it is interpreted that the
section or the whole of the moving image represented by
the representative image is selected, and a function
corresponding to the purpose is applied to the selected
section or the whole of the moving image.

20

43. The moving image management method according to
claim 40, further comprising:

an adding step of adding information indicating a
purpose of said representative image as attribute
25 information;

a step of recording the attribute information
added by said adding means in correspondence with said

representative image; and
a step of classifying only said representative
image for each purpose based on said attribute
information.

5

44. The moving image management method according to
claim 43, wherein when said representative image is
designated by the user, it is interpreted that the
section or the whole of the moving image represented by
10 the representative image is selected, and a function
corresponding to the purpose is applied to the selected
section or the whole of the moving image.

45. The moving image management method according to
15 claim 15, wherein when said information indicating the
section or the whole of the moving image represented by
said representative image and said attribute information
are recorded on the storage medium, they are recorded by
representative image in a particular continuous portion.

20

46. The moving image management method according to
claim 45, wherein when said information indicating a
position of an image as a base of said representative
image and said representative image are recorded on the
25 storage medium, they are recorded by representative
image in a particular portion.

47. The moving image management method according to claim 46, wherein said particular portion is a continuous area on the storage medium.

5 48. The moving image management method according to claim 46 or 47, wherein only significant information of said information indicating a position of an image as a base of said representative image and said representative image is recorded in a portion for easily
10 storage and access.

49. The moving image management method according to any one of claims 41 to 48, wherein at said step of recording information indicating a purpose of said representative image as attribute information, said attribute information is an identification number previously defined for purpose.
15

50. The moving image management method according to claim 42, wherein at said step of selecting only said representative image corresponding to the purpose based on said attribute information, a representative image having said attribute information corresponding to a browsing operation is selected,
20
25 and said method has a display step of displaying the representative image,
 further wherein application of function

corresponding to the purpose to the selected section or the whole of the moving image is a reproduction step of, when a desired representative image is designated from representative images displayed at said display step,

5 reproducing a corresponding moving image based on section information added to the representative image.

51. The moving image management method according to claim 41, wherein if an editing range is designated in a
10 desired moving image, at said step of selecting only said representative image corresponding to the purpose based on said attribute information, a representative image having said attribute information corresponding to an editing operation and within the editing range is
15 selected,

and wherein said method has a display step of displaying the representative image within said editing range.

20 52. The moving image management method according to claim 42, wherein in a print operation to print a desired frame in a desired moving image, at said step of selecting only said representative image corresponding to the purpose based on said attribute information, a
25 representative image having said attribute information corresponding to the print operation is selected from representative images corresponding to said desired

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moving image,

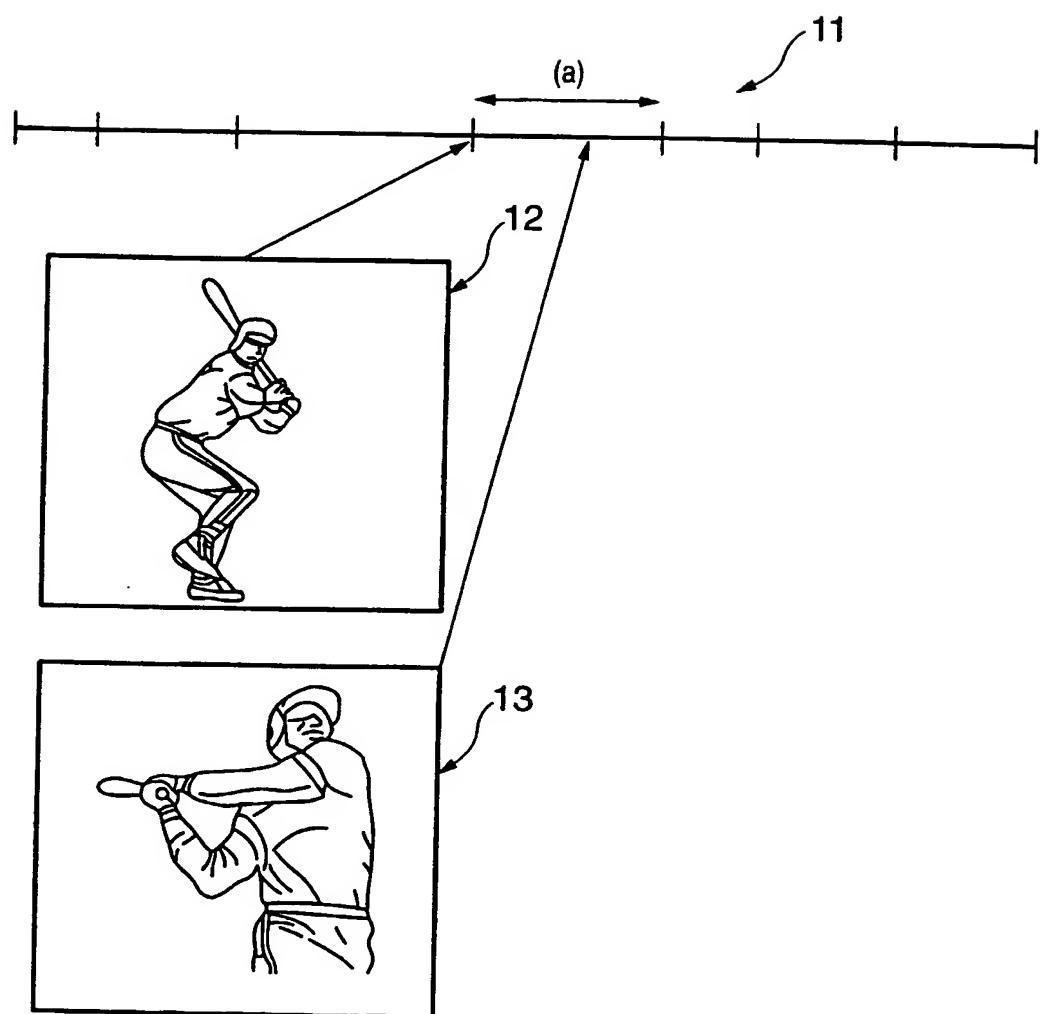
and wherein said method has a display step of displaying the representative image having said attribute information corresponding to the print
5 operation,
further wherein application of function corresponding to a designated purpose to the selected section or the whole of the moving image when a desired representative image is designated from representative
10 images displayed at said display step, is an output step for, when a desired representative image is designated from representative images displayed at said display step, referring to the information indicating a position of an image as a base of said representative image, and
15 outputting a desired frame for print output.

53. A storage medium holding a control program for executing the moving image management method according to any one of claims 19 to 36 by a computer.

20

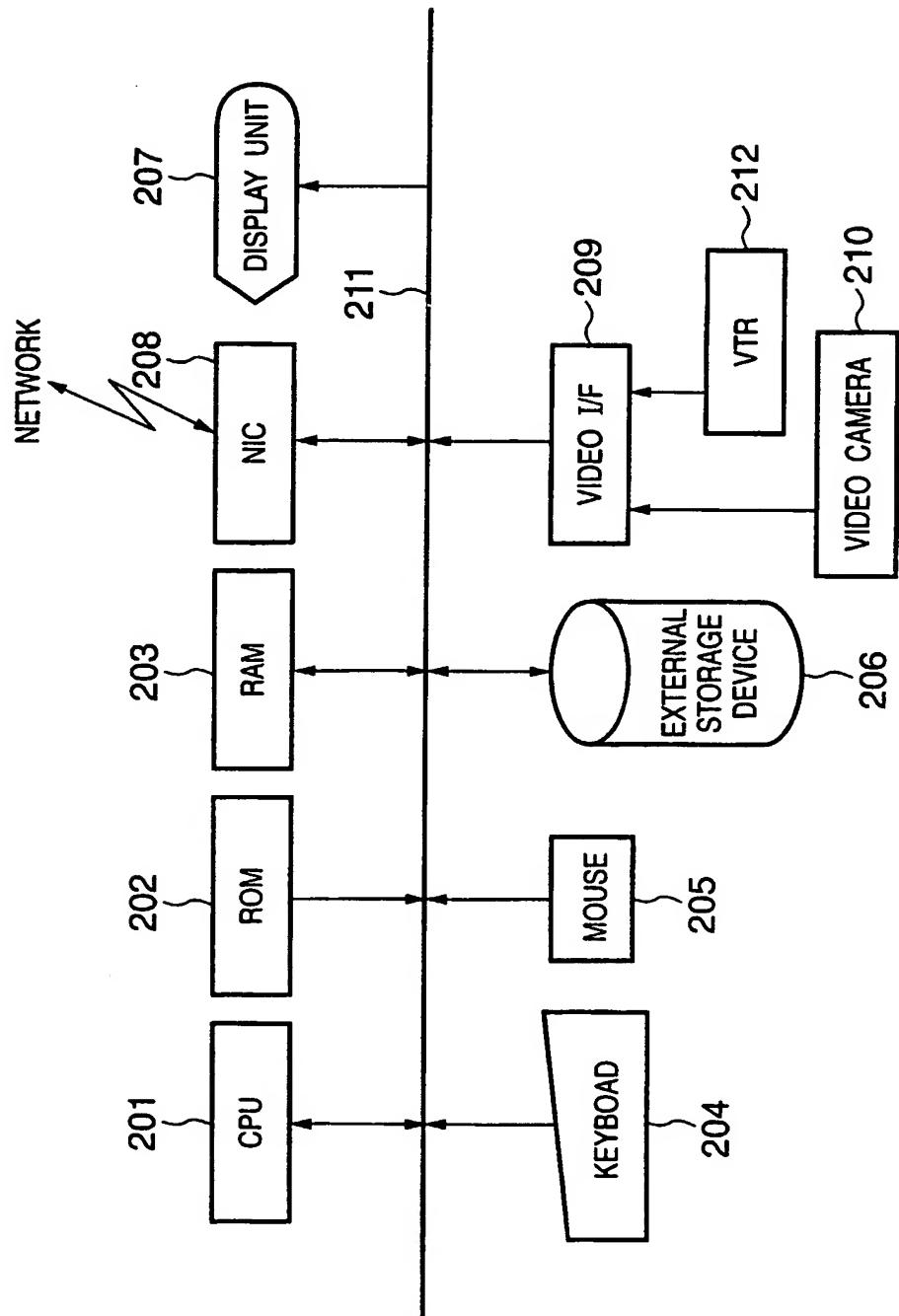
54. A control program for executing the moving image management method according to any one of claims 19 to 36 by a computer.

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F I G. 1

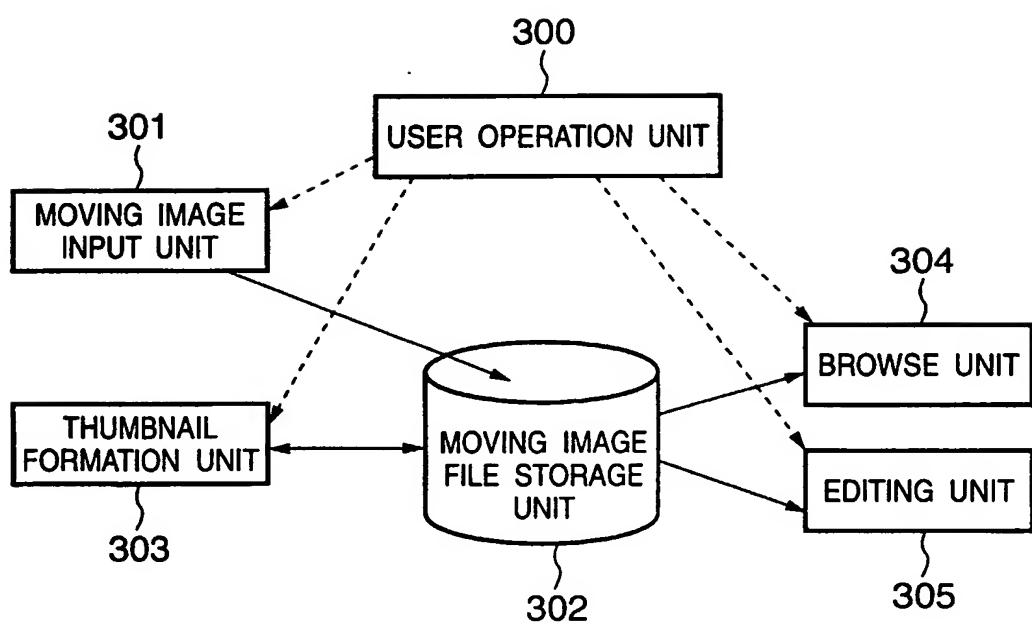
2/13

FIG. 2



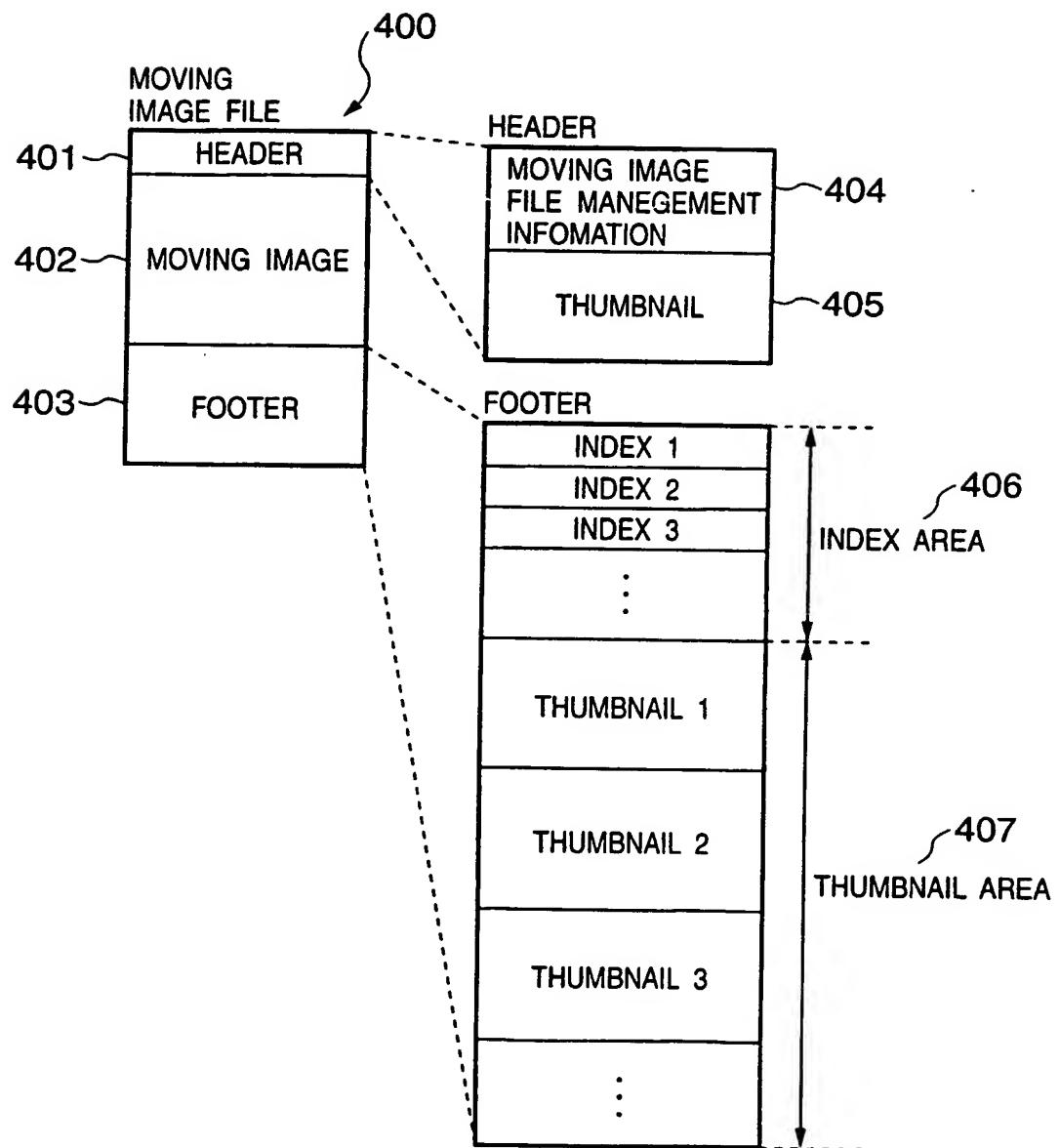
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FIG. 3



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FIG. 4

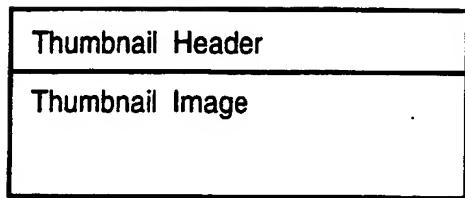


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FIG. 5

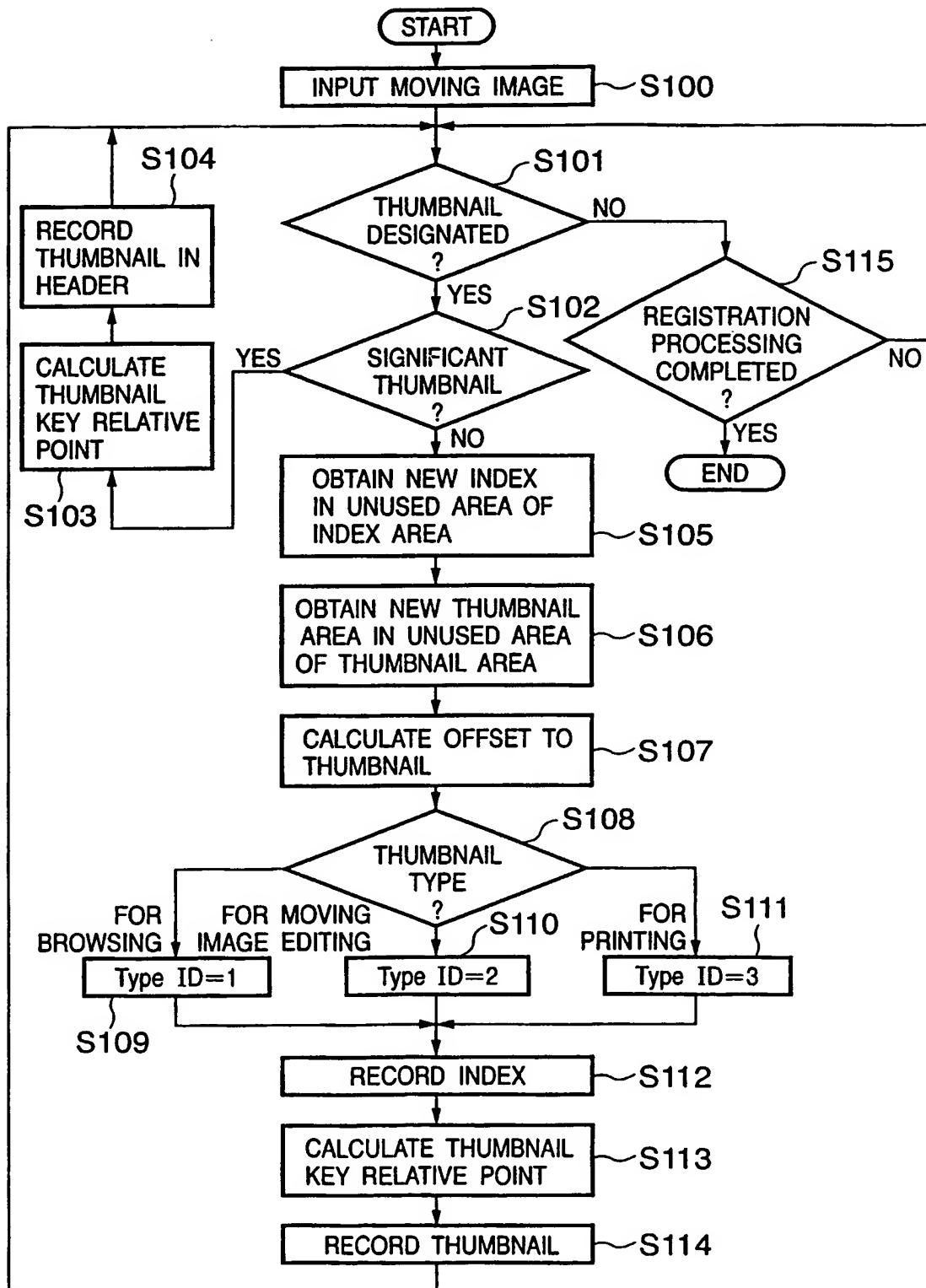
Length (Bytes)	Contents
6	Start Point
6	End Point
2	Thumbnail Type ID
4	Thumbnail Offset

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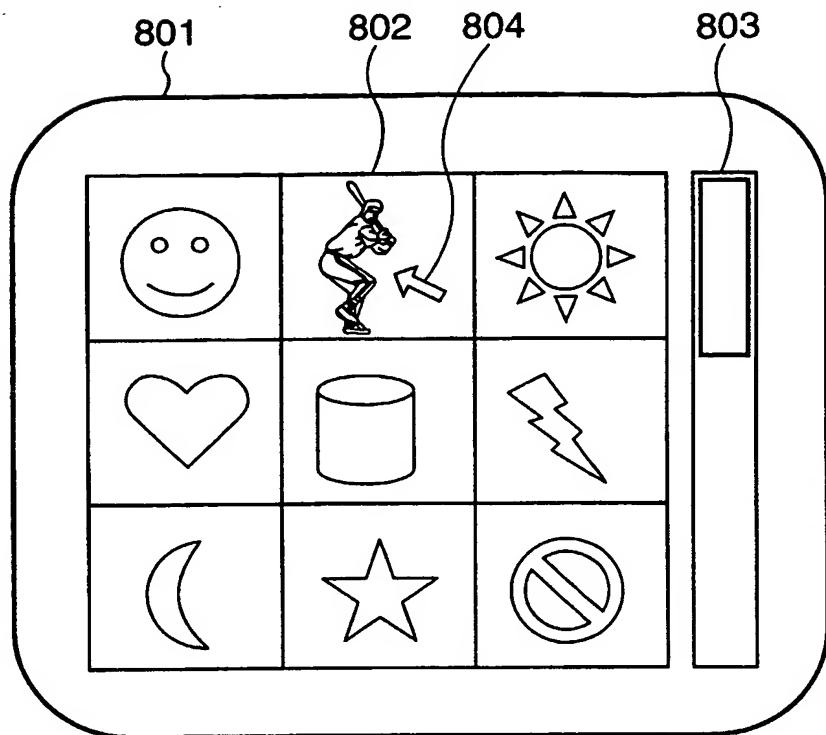
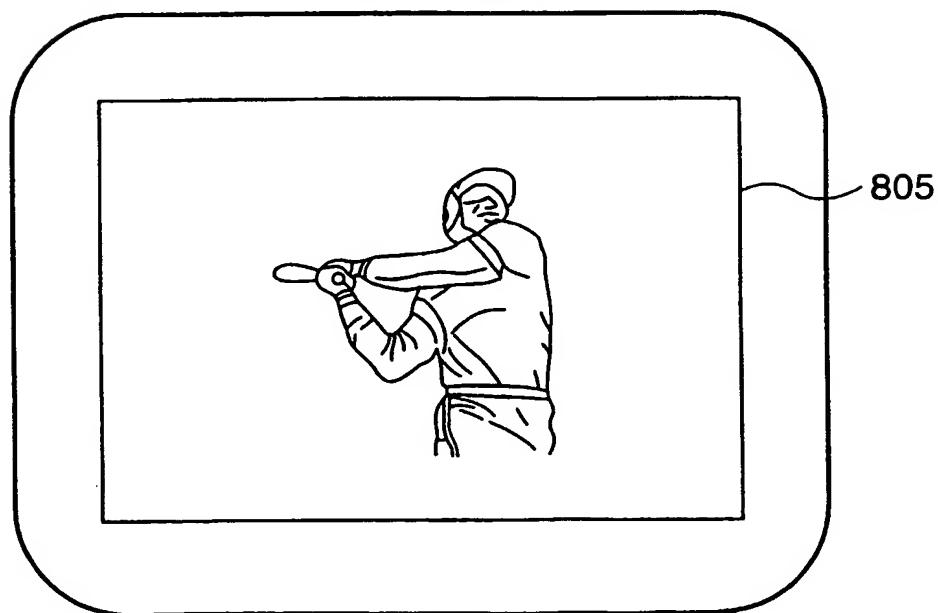
F I G. 6A**F I G. 6B**

Length (Bytes)	Contents
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6	Thumbnail Key Relative Point
4	Thumbnail Image Offset

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F I G. 7

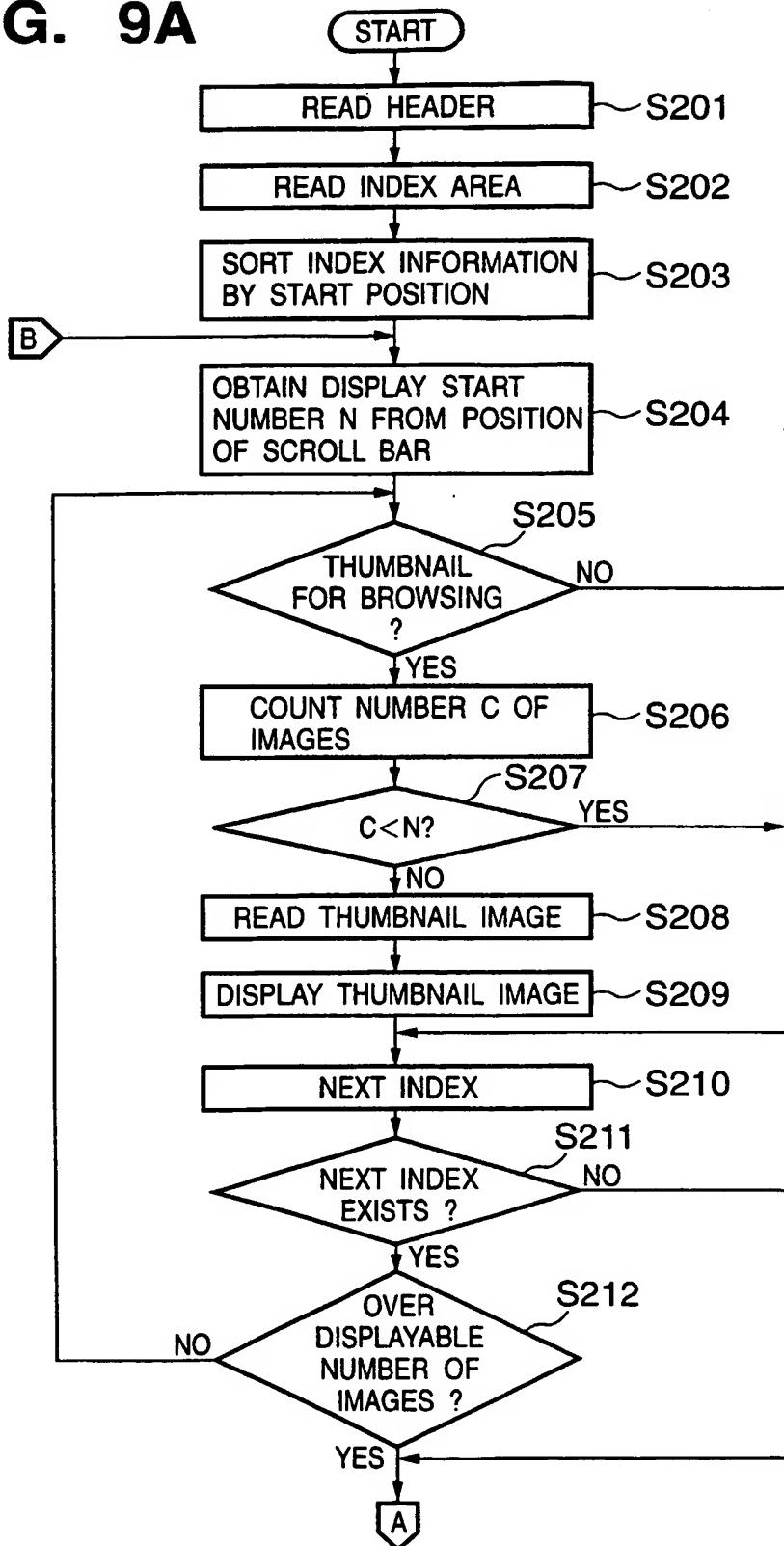


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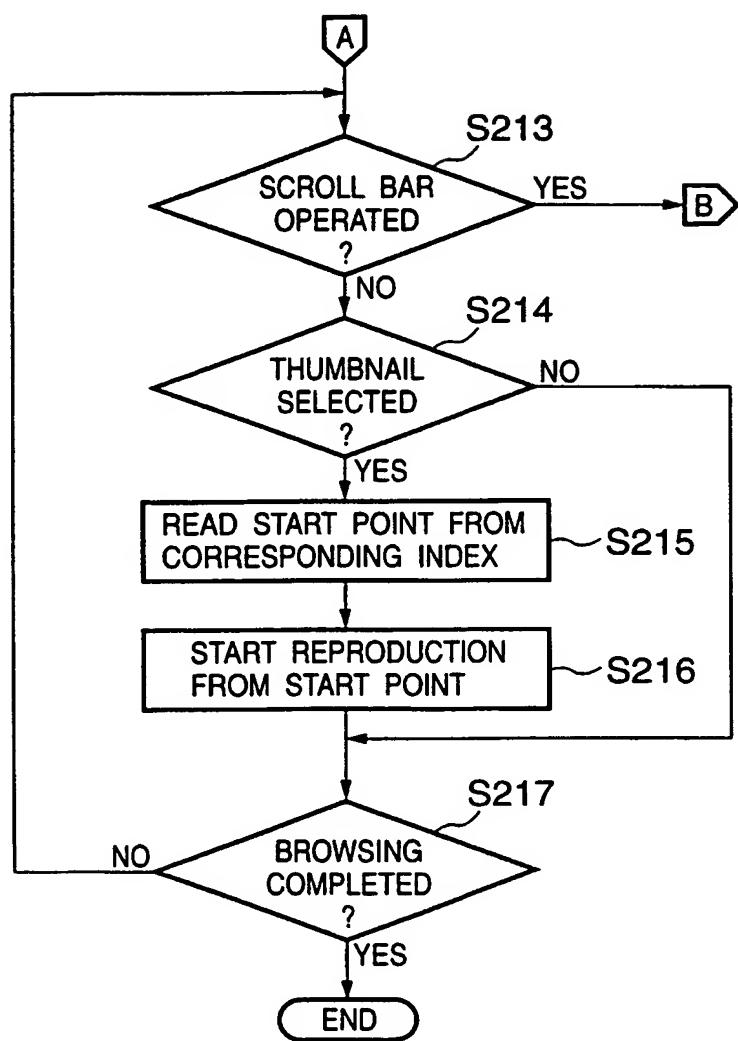
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FIG. 9A

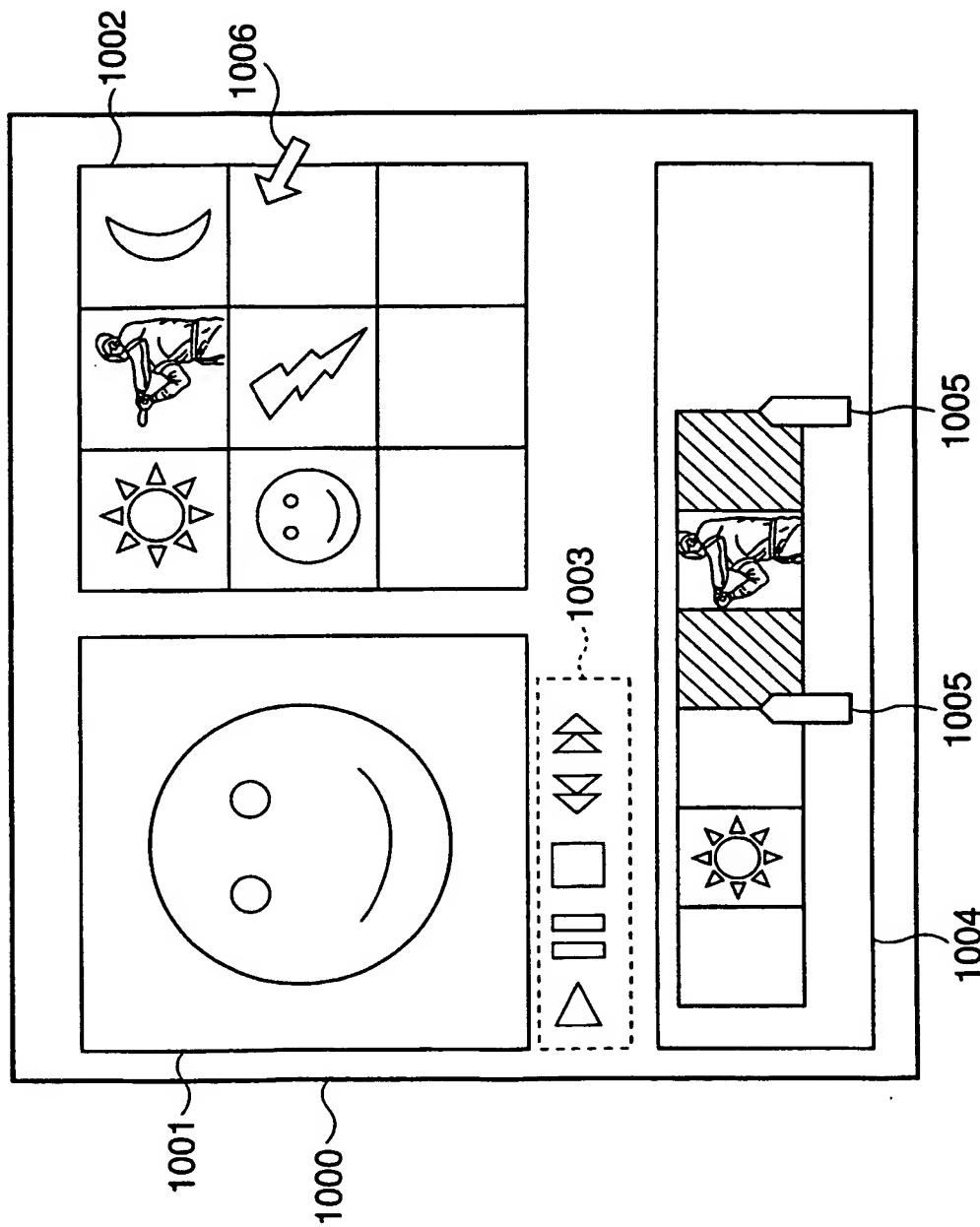


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FIG. 9B

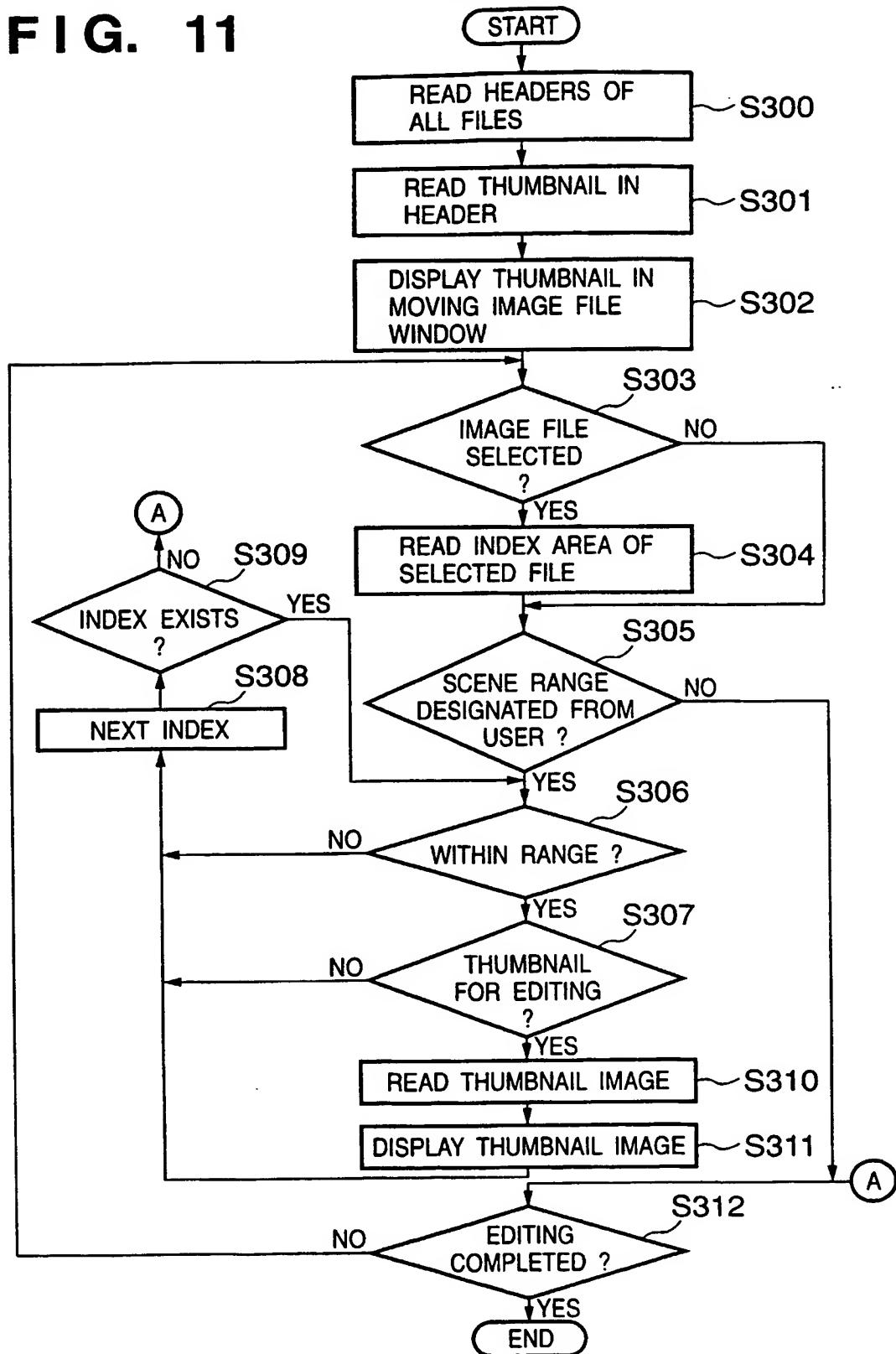


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FIG. 10

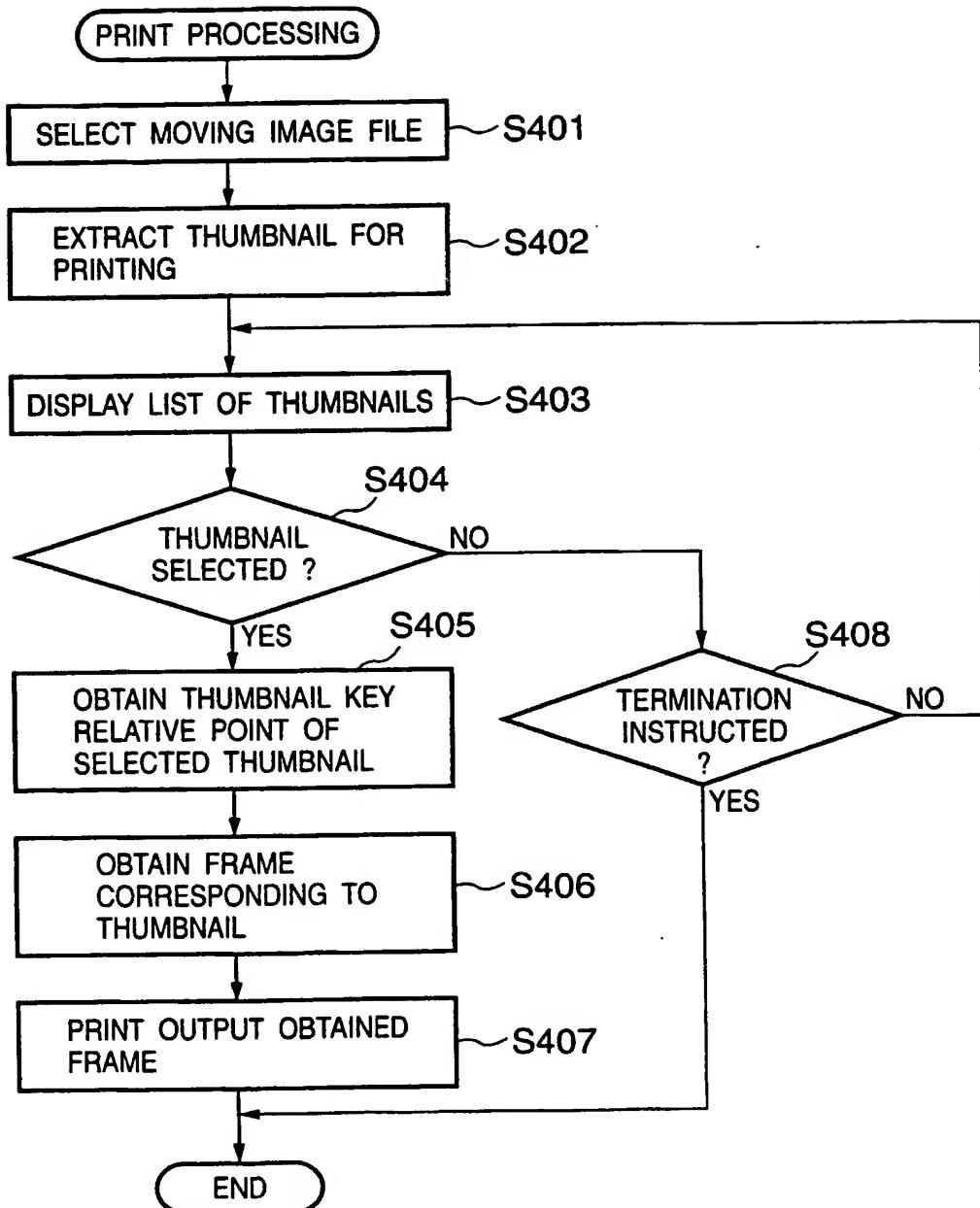
4

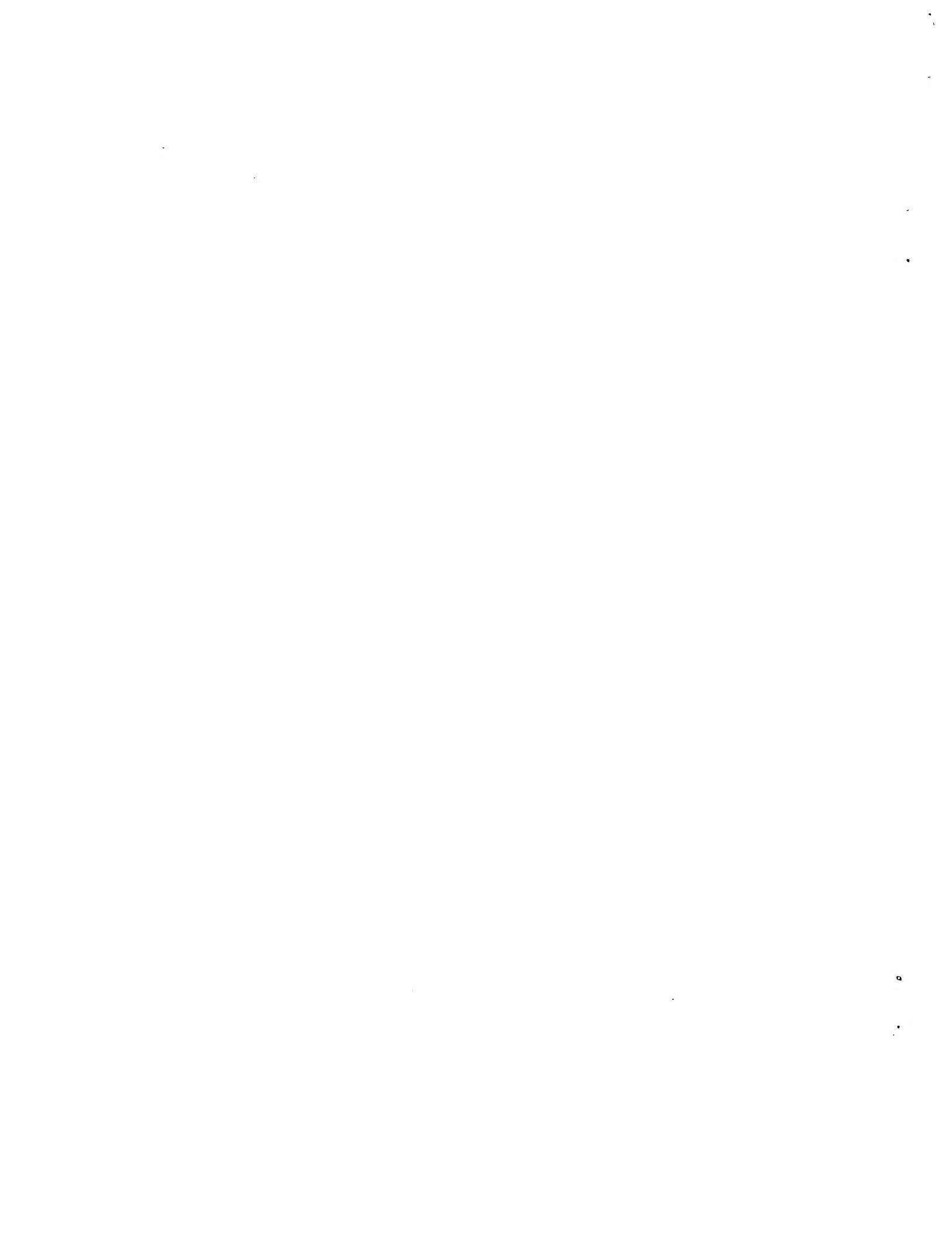
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F I G. 11

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FIG. 12





INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP 02/05228

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 G11B27/031 G11B27/034 G11B27/34 G11B27/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 G11B G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 945 864 A (SONY CORP) 29 September 1999 (1999-09-29)	1-3, 10-16, 23-29, 36-42, 49-54
Y	abstract column 1, line 1 -column 2, line 12 column 19, line 29 - line 37 figures 2,6 --- -/-	4-9, 17-22, 30-35, 43-48

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search

20 August 2002

Date of mailing of the international search report

28/08/2002

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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